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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/059,421	01/31/2002	Tetsuo Shibuya	YOR920010126US2	6845

21254 7590 09/12/2006

MCGINN INTELLECTUAL PROPERTY LAW GROUP, PLLC
8321 OLD COURTHOUSE ROAD
SUITE 200
VIENNA, VA 22182-3817

EXAMINER

LY, CHEYNE D

ART UNIT PAPER NUMBER

2168

DATE MAILED: 09/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/059,421

Applicant(s)

SHIBUYA ET AL.

Examiner

Cheyne D. Ly

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11, 13-23 and 25-30 is/are rejected.
- 7) ☒ Claim(s) 12 and 24 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application
- ☐ Other: _____

DETAILED ACTION

1. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.
2. Claims 1-30 are examined on the merits.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. **Claims 1-8, 10, 11, 13-23, 25, and 27-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ganguly et al. (1996) (Ganguly hereafter) in view of Rigoutsos et al. (1999) (Rigoutsos hereafter).**

6. It is noted that Rigoutsos et al. (1998) has been cited to describe the well-known in the art characteristics of the Teiresias algorithm.

7. In regard to claim 1, Ganguly describes:

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- a. An input device for inputting a genomic DNA sequence (page 200, section 2, The Data Model, and Figure 1);
 - b. Translates an open reading frame (ORF) of said DNA sequence into an amino acid (page 203, section 4.2, especially, "Locate open reading frames", and page 206 in its entirety).
8. However, Ganguly does not describe the pattern database comprising patterns of amino acids and "locates...a putative gene in said DNA sequence."
9. Rigoutsos describes:
 - c. A pattern database comprising patterns of amino acids (page 225, column 2, The Database section);
 - d. A processor which:
 - i. Locates in said amino acid translation occurrences of said patterns from said pattern database to determine whether said open reading frame includes a putative gene in said DNA sequence (page 228, column 2, lines 4-11).
10. Ganguly describes a "database system...will greatly enhance current sequence analysis efforts, by providing a framework for integrating currently existing algorithms" (page 200, lines 9-12). Rigoutsos describes a sequence analysis method using a database containing unaligned ORFs for pattern discovery (Abstract etc.). Therefore, one of ordinary skill in the art at the time of the invention would have been motivated by Ganguly to integrate said database system with the pattern database of Rigoutsos to greatly enhance current sequence analysis efforts.

Therefore, it would have been obvious to one of ordinary skill in the art to integrate the database

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system of Ganguly with the pattern database of Rigoutsos to greatly enhance current sequence analysis efforts.

2. In regard to claim 2, Rigoutsos and Ganguly describe the claim invention as cited above.

Further, the court held that mere duplication of parts has no patentable significance unless a new and unexpected result is produced. See *In re Harza*, 274 F.2d 669, 124 USPQ 378 (CCPA 1960). Therefore, it would have been obvious to one of ordinary skill in the art to integrate the database system of Ganguly with the pattern database of Rigoutsos to greatly enhance current sequence analysis efforts.

3. In regard to claim 3, Rigoutsos describes patterns comprise biologically significant patterns of amino acid sequences (page 225, column The Database section). Therefore, it would have been obvious to one of ordinary skill in the art to integrate the database system of Ganguly with the pattern database of Rigoutsos to greatly enhance current sequence analysis efforts.

4. In regard to claim 4, Rigoutsos describes processor identifies a match of a pattern from said pattern database in said amino acid translation (page 226, column 2, lines 4-14, page 228, column 2, lines 4-15, and Figure 8). Therefore, it would have been obvious to one of ordinary skill in the art to integrate the database system of Ganguly with the pattern database of Rigoutsos to greatly enhance current sequence analysis efforts.

5. In regard to claim 5, Rigoutsos describes patterns are derived from a parent database comprising at least one amino acid sequence (page 224, column 1, lines 36-39). Therefore, it would have been obvious to one of ordinary skill in the art to integrate the database system of

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Ganguly with the pattern database of Rigoutsos to greatly enhance current sequence analysis efforts.

6. In regard to claim 6, Rigoutsos describes patterns are derived from a parent database comprising at least one amino acid sequence fragment (page 224, column 1, lines 36-39, and page 225, column 2, The Database section). Therefore, it would have been obvious to one of ordinary skill in the art to integrate the database system of Ganguly with the pattern database of Rigoutsos to greatly enhance current sequence analysis efforts.
7. In regard to claim 7, Rigoutsos describes patterns are derived by using a pattern discovery algorithm (page 225, column 2, The Database section). Therefore, it would have been obvious to one of ordinary skill in the art to integrate the database system of Ganguly with the pattern database of Rigoutsos to greatly enhance current sequence analysis efforts.
8. In regard to claim 8, Rigoutsos describes patterns are derived by using the Teiresias algorithm (page 225, column 2, The Database section). Therefore, it would have been obvious to one of ordinary skill in the art to integrate the database system of Ganguly with the pattern database of Rigoutsos to greatly enhance current sequence analysis efforts.
9. In regard to claim 10, Rigoutsos describes processor reports said ORF as a putative gene when a predetermined number of pattern matches is identified in said amino acid translation (page 225, columns 1-2, 1D Dictionary / Selecting The Various Parameters section, and page 228, column 2, lines 4-16). Therefore, it would have been obvious to one of ordinary skill in the art to integrate the database system of Ganguly with the pattern database of Rigoutsos to greatly enhance current sequence analysis efforts.

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10. In regard to claim 11, Rigoutsos describes each pattern is assigned a weight depending upon a relevance of said pattern in determining whether said ORF comprises a putative gene (page 224, column 2, lines 23-31, and page 226, column 2, lines 4-14). Therefore, it would have been obvious to one of ordinary skill in the art to integrate the database system of Ganguly with the pattern database of Rigoutsos to greatly enhance current sequence analysis efforts.
11. In regard to claim 13, Rigoutsos describes match is identified using a predetermined pattern matching algorithm (page 226, column 2, lines 4-14, page 228, column 2, lines 4-15, and Figure 8). Therefore, it would have been obvious to one of ordinary skill in the art to integrate the database system of Ganguly with the pattern database of Rigoutsos to greatly enhance current sequence analysis efforts.
12. In regard to claim 14, Rigoutsos describes a memory device for storing and instructions to be executed by said processor (page 223, column 2, lines 10-22). It is noted that Rigoutsos et al. (1998) describes processing the input set with TEIRESIAS required only a few seconds on an IBM Power-PC workstation (page 60, lines 1-3). Therefore, it would have been obvious to one of ordinary skill in the art to integrate the database system of Ganguly with the pattern database of Rigoutsos to greatly enhance current sequence analysis efforts.
13. In regard to claim 15, Rigoutsos describes a display device for displaying an output from said processor (page 223, column 2, lines 10-22, and Figures 8 and 9). It is noted that Rigoutsos et al. (1998) describes processing the input set with TEIRESIAS required only a few seconds on an IBM Power-PC workstation (page 60, lines 1-3). Therefore, it would have

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been obvious to one of ordinary skill in the art to integrate the database system of Ganguly with the pattern database of Rigoutsos to greatly enhance current sequence analysis efforts.

14. In regard to claims 16-23, 25, and 27-29, the citation of Rigoutsos and Ganguly above describe a method for using the system comprising the Teiresias algorithm, which anticipates the claimed invention as required by claims 16-23, 25, and 27-29. Therefore, it would have been obvious to one of ordinary skill in the art to integrate the database system of Ganguly with the pattern database of Rigoutsos to greatly enhance current sequence analysis efforts.

RESPONSE TO ARGUMENTS

15. It is noted that the 102 (b) as directed Rigoutsos has been withdrawn. Applicant's arguments directed to Rigoutsos alone are moot because Ganguly in combination with Rigoutsos describe the argued limitations. For example, Ganguly describes "a search might look for open reading frames (ORFs) which match a given putative codon usage (page 199, last line, to page 200, line 3). Ganguly describes locating ORFs introns and exon of genes, retrieving the coding sequences for genes coding for enzymes that act as kinases (page 203, section 4.2, to page 205), and translating said sequences in to amino-acid sequences (page 206). Applicant's argument (pages 3-8) is not persuasive because Ganguly in view of Rigoutsos as cited above renders the claimed invention obvious over the prior art.

16. **Claims 9, 26, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ganguly et al. (1996) (Ganguly hereafter) and Rigoutsos et al. (1999) (Rigoutsos hereafter) as applied to claims 1-8, 10, 11, 13-23, 25, and 27-29 above, and further in view of Delcher et al. (1999) (Delcher hereafter).**

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17. Ganguly and Rigoutsos describe the invention as required by claims 1-8, 10, 11, 13-23, 25, and 27-29.
18. Specific to the limitation of “a display device...” of claim 30, Rigoutsos describes the claimed display device in Figures 8 and 9.
19. However, Ganguly and Rigoutsos do not describe the limitation of “ORF comprises a portion of said DNA sequence between a start codon and a stop codon” as required by claims 9, 26, and 30.
20. Delcher describes an improvement to make GLIMMER more accurate for gene identification (Abstract etc., page 4639, column 2, last two lines). Therefore, one of ordinary skill in the art at the time of the instant invention would have been motivated by Delcher to improve the accuracy of GLIMMER by using the system described by Ganguly and Rigoutsos for specificity and sensitivity (Rigoutsos, page 224, column 2, last paragraph) for greater accuracy.
21. In regard to claims 9, 26, and 30, Delcher describes ORF comprises a portion of said DNA sequence between a start codon and a stop codon (page 4640 column 2, Table 5).
22. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the instant invention to use the system as described by Ganguly, Rigoutsos and Delcher to improve accuracy.
23. It is noted that lines 8-9 of claim 26 recites optional limitation of “a sum...exceed a predetermined threshold” which has not been cited in either Rigoutsos or Delcher. Due to said being optional, the citation of said optional limitation is not required for the instant prior art rejection, because Ganguly, Rigoutsos, and Delcher have been cited to describe the

alternative limitation of “a predetermined number of matches is identified in said amino acid translation.”

RESPONSE TO ARGUMENTS

24. On page 8, Applicant’s argument that “these references would not have been combined as suggested by the Examiner...these references are unrelated...” is not persuasive. Delcher describes an improvement to make GLIMMER more accurate for gene identification (Abstract etc., page 4639, column 2, last two lines). Therefore, one of ordinary skill in the art at the time of the instant invention would have been motivated by Delcher to improve the accuracy of GLIMMER by using the system described by Rigoutsos for specificity and sensitivity (Rigoutsos, page 224, column 2, last paragraph) for greater accuracy. Further, Ganguly describes a “database system...will greatly enhance current sequence analysis efforts, by providing a framework for integrating currently existing algorithms” (page 200, lines 9-12). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the instant invention to use the system as described by Ganguly, Rigoutsos and Delcher to improve accuracy in sequence analysis efforts.
25. On pages 8-9, Applicant’s arguments directed to “a processor...in said DNA sequence” are not persuasive because Ganguly in combination with Rigoutsos as a whole describes the argued limitations, as discussed above.
26. Specific to the arguments on pages 9-10, it is noted that claims are given their broadest reasonable interpretation consistent with the specification. However, the instant claims are not limited to the argued limitations that have been cited by Applicant as limitations as not being disclosed by the cited references. As cited by the MPEP, the court explained that

“reading a claim in light of the specification, to thereby interpret limitations explicitly recited in the claim, is a quite different thing from reading limitations of the specification into a claim,” to thereby narrow the scope of the claim by implicitly adding disclosed limitations which have no express basis in the claim.” The court found that applicant was advocating the latter, i.e., the impermissible importation of subject matter from the specification into the claim.). See also *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027-28 (Fed. Cir. 1997) (MPEP §2111 [R-1]).

27. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

CONCLUSION

28. Claims 12 and 24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
29. Patent applicants with problems or questions regarding electronic images that can be viewed in the Patent Application Information Retrieval system (PAIR) can now contact the USPTO's Patent Electronic Business Center (Patent EBC) for assistance. Representatives are available to answer your questions daily from 6 am to midnight (EST). The toll free number is (866) 217-9197. When calling please have your application serial or patent number, the type of document you are having an image problem with, the number of pages and the

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specific nature of the problem. The Patent Electronic Business Center will notify applicants of the resolution of the problem within 5-7 business days. Applicants can also check PAIR to confirm that the problem has been corrected. The USPTO's Patent Electronic Business Center is a complete service center supporting all patent business on the Internet. The USPTO's PAIR system provides Internet-based access to patent application status and history information. It also enables applicants to view the scanned images of their own application file folder(s) as well as general patent information available to the public.

30. For all other customer support, please call the USPTO Call Center (UCC) at 800-786-9199. The USPTO's official fax number is 571-272-8300.
31. Any inquiry concerning this communication or earlier communications from the examiner should be directed to C. Dune Ly, whose telephone number is (571) 272-0716. The examiner can normally be reached on Monday-Friday from 8 A.M. to 4 P.M.
32. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tim Vo, can be reached on (571) 272-3642.

C. Dune Ly *CDL*
Patent Examiner
9/8/06

Camy Tung
primary Examiner
Camy Tung